



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/584,922

06/29/2006

Satoshi Matsubayashi

062663

1322

38834

7590

05/27/2010

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP  
1250 CONNECTICUT AVENUE, NW  
SUITE 700  
WASHINGTON, DC 20036

EXAMINER

STEWART, KIMBERLY ANN

ART UNIT

PAPER NUMBER

1791

NOTIFICATION DATE

DELIVERY MODE

05/27/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com



### DETAILED ACTION

This is a non-final Office action in response to the claims submitted on 6-29-2006.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 1791

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. *Claims 11, 13-16, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiga et al (EP 1,536,543, using 2006/0103253 for citation purposes), in view of Osada et al (US 5,435,953).*

5. Regarding claim 11, Shiga et al teach a method of resin sealing permanent magnets in a laminated rotor core comprising:

6. a first step of inserting the permanent magnets respectively in a plurality of magnet insertion holes in the laminated rotor core formed by a stack of a plurality of core pieces [0036];

7. a second step of disposing the laminated rotor core between a lower die and an upper die, the lower die being provided for placing the laminated rotor core thereon, the upper die pairing with the lower die [0040, Fig 8a, 8b, parts 18, 32a, 32b];

8. a third step of pressing and heating the laminated rotor core by the upper die and the lower die [0040, Fig 8a, 8b; heating is implied by molten state of the resin]; and

9. a fourth step of filling the magnet insertion holes of the laminated rotor core with the liquefied resin material [0040].

10. Shiga et al do not teach the upper die having resin reservoir pots or the specific arrangement of such pots, or said pressing and heating is done while heating and liquefying raw resin material put in the resin reservoir pots by the upper die, or that the

Art Unit: 1791

liquefied resin material is being inserted from the upper die by ejecting the liquefied resin material from the resin reservoir pots by plungers, the plungers being inserted and moving vertically in the resin reservoir pots. However, Osada et al teach, in the analogous field of molding resin for sealing an electronic device, a molding apparatus with upper and lower dies [upper and lower mold sections, with upper or lower mold sections capable of having resin pots [Abs, 6:60-61] with plungers [10:60-61] for the benefit of providing a resin source conveniently integral with the molding apparatus, pressurizing resin material each fitted to the pots, and for forcing out air and moisture from the sealed area and the resin so voids are not formed. Osada et al also teach an electronic device being sealed with the electronic device analogous to the rotor core] such device being heated between the two heated mold sections [11:56-57] for the benefit of providing a heated surface for which resin to flow around, as well as teaching heating and liquefying [melting] raw resin material put in the reservoir pots in the upper die, such melted resin being injected into the cavities [6:60-64], with the injecting done by plungers moving vertically [up and down] [11:9-20] for the benefit of pushing flowable resin into cavities between the upper and lower mold sections to seal an object [1:40-50].

11. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify or combine the teachings of Shiga et al with those of Osada et al for the benefits of providing a resin source conveniently integral with the molding apparatus, providing a heated surface for which resin to flow around, and pushing

Art Unit: 1791

flowable resin into cavities between the upper and lower mold sections to seal an object.

12. Regarding the resin reservoir pots provided in the upper die vertically penetrate the upper die, Osada et al teach such [6:60-61] for the benefit of having flexibility as to where the resin pots can be placed, and so the resin can expand and force out unwanted air and moisture [7:35-46], or excluding the outer air from an outer side periphery of at least a pot, a resin path, and a cavity portion [6:62-67].

13. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify or combine the teachings of Shiga et al with those of Osada et al or Sera for the benefits of having flexibility as to where the resin pots can be placed, and so the resin can expand and force out unwanted air and moisture, or for the benefit of being able to be pressed by a plunger and forces out of the pot through runners and gates into the cavities [1:22-25].

14. Regarding the resin reservoir pots in the upper die [Osada] are in a region radially inward of and different from positions of the magnet insertion holes as viewed from a top thereof, and the liquefied resin material is supplied to the magnet insertion holes from the resin reservoir pots through resin passages formed on an undersurface of the upper die, Shiga teaches several configurations or embodiments [0048, 0062, 0065, Figs 11-14, 15, 16] for magnets and resin flow paths, and Osada teach resin reservoir pots may be located in an upper die [6:61-61] which then delivers resin through a resin path to a cavity between the upper and lower dies [6:62-64] for the purpose of injecting with pressure to exclude unwanted air or moisture from resin,

Art Unit: 1791

cavities, and /or pots, and to fill the resin in such a way as to then avoid the formation of voids and defective portions in the molded resin body or area [6:40-48]. Shiga et al also disclose that their particular arrangement of the magnets is for a magnet motor of the outer rotor type [Abs] (rotor encloses the stator), which would suggest a different arrangement of magnets and therefor possibly pot positions for an inner rotor type.

15. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify or combine the teachings of Shiga et al and Osada et al for the benefit of injecting with pressure to exclude unwanted air or moisture from resin, cavities, and /or pots, and to fill the resin in such a way as to then avoid the formation of voids and defective portions in the molded resin body or area, and to arrange the resin pots in such a way with respect to the magnet insertion holes so as to accomplish the above benefits. Since Shiga et al in view of Osada et al disclose the claimed invention except for the specific arrangement of parts, it would have also been obvious to one of ordinary skill in the art at the time of the invention to arrange the resin pots, passages, and magnet insertion holes to achieve the desired effect, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

16. Regarding claim 13, Shiga et al teach wherein the laminated rotor core has a shaft hole in a center thereof [Fig 1, part 20, 0035], and the laminated rotor core is disposed between the upper die and the lower die [Fig 8a, 8b, parts 18, 32a 32b] in a state that the laminated rotor core is placed on a carrier tray [lower die] having a guide

Art Unit: 1791

member [part of lower die closest to the rotor core and magnet] fitted in the shaft hole of the laminated rotor core. Examiner considers that lower die may be separated into two pieces, with a lower portion of the lower die as the carrier to support the rotor core for molding, and the portion of the lower die closest to the rotor core and magnet serving as a guide means.

17. Since Shiga et al disclose the claim limitations except for two separate parts of a carrier tray and a guide means, it would have been obvious to one having ordinary skill in the art at the time of the invention to make the lower support die into two pieces since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. Nerwin v. Erlichman, 168 USPQ 177, 179.

18. Regarding claim 14, Shiga et al teach resin sealing magnets in a rotor core as set forth above.

19. Shiga et al do not teach wherein the carrier tray [or lower die as considered above in claim 13] is provided with lower vent grooves for release of air, the lower vent grooves being respectively in communication with lower ends of the magnet insertion holes. However, Osada teach vent grooves in the mold [or die] surfaces 11:23-28, 16:56-57] for the benefit of having an area for air and moisture to be forced out of the resin and out of the molded sealed area [5:59-62].

20. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify or combine the teachings of Shiga et al with those of Osada et al for the benefit of having a carrier to carry the object to be sealed or encapsulated to the



Art Unit: 1791

die area for molding. It would also be obvious to include vent grooves if desired for the same reasons as adding them to the mold surface – to allow unwanted air and moisture to escape.

21. Regarding claim 15, Shiga et al teach wherein the filling of the magnet insertion holes with the liquefied resin material is carried out with a difference in level between an upper end of the laminated rotor core and an upper end of each of the permanent magnets [Fig 8a, 8b, parts 18, 32a 32b, 35].

22. Regarding claim 16, Shiga et al teach resin sealing magnets in a rotor core as set forth above.

23. Shiga et al do not teach wherein the upper die is provided with upper vent grooves for release of air, the upper vent grooves being respectively in communication with upper ends of the magnet insertion holes. However, Osada et al teach such [air vents on upper or lower die [mold] surface(s), 11:23-28, 16:56-57, Fig 5, part 58] for the benefit of having an area for air and moisture to be forced out of the resin and out of the molded sealed area [5:59-62]. The examiner considers that additional vents would be located where they would be in contact or communication with where the resin would be flowing, since the air or moisture may need to be evacuated from such area and/or resin.

24. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify or combine the teachings of Shiga et al with those of Osada et al

Art Unit: 1791

for the benefit of having an area for air and moisture to be forced out of the resin and out of the molded sealed area.

25. Regarding claim 19, Shiga et al teach wherein the laminated rotor core disposed between the upper die and the lower die in the second step is preheated [heat is implied as per the resin being molten while traveling in the rotor core flowing around the magnets, Fig 8a, 8b, 0040].

26. *Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiga et al (EP 1,536,543, using 2006/0103253 for citation purposes) in view of Osada et al as applied to claim 11, and further in view of Sera (US 4, 386,898).*

27. Regarding claim 17, Shiga et al teach resin sealing magnets in a rotor core as set forth above, including a resin that is rendered flowable by heat [0040], the resin then setting or hardening [0041], which implies a thermosetting resin, but could also be thermoplastic.

28. Shiga et al do not explicitly teach wherein the resin material is a thermosetting resin and is thermally cured after being injected into the magnet insertion holes. However, Sera disclose that it is known to use thermosetting resin in such molding processes [1:20-22] for the benefit of providing the desired properties to the end product, using resins with the desired viscosity [1:59-60], and resins that can be suitably cured within the process.

Art Unit: 1791

29. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify or combine the teachings of Shiga et al and Sera for the benefit of providing the desired properties to the end product, using resins with the desired viscosity, and resins that can be suitably cured within the process.

*30. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiga et al in view of Osada as applied to claim 11 above, and further in view of Venrooij (WO 2005/120799, using US 2008/0277825 for citation purposes).*

31. Regarding claim 20, Shiga et al teach resin sealing magnets in a rotor core as set forth above, including a rotor core mounted on a lower die [Fig 8a, 8b], with heating implied per the molten state of the resin [0040].

32. Shiga et al in view of Osada or Sera do not teach wherein the laminated rotor core mounted on the lower die is heated from outside by an induction heating means. However, induction heating means are known in the art and are often used in heat treatment involving metal items, as well as magnetic materials in particular. Venrooij teaches, in the analogous field of encapsulation of electronic components, such [0011] as an alternate heating means for heating during encapsulation for the benefit of increased localized heating capacity and uniform heating of the encapsulating material.

33. It would have been obvious to one having ordinary skill in the art at the time of the invention to modify or combine the teachings of Shiga et al in view of Osada or Sera

Art Unit: 1791

with those of Venrooij for the benefit of increased localized heating capacity and uniform heating of the encapsulating material.

### ***Response to Arguments***

34. Applicant's arguments filed 2-19-2010 have been fully considered and are addressed as follows:

35. Regarding the applicant's assertion that Shiga does not disclose the resin pots reaching the upper surface of the core nor the plungers inserted into the pots, the examiner concurs, but Osada is brought in to demonstrate that resin pots may be in an upper die, and for plungers to be inserted into pots to push the resin.

36. Regarding Shiga's magnets placed more radially inward from the insertion holes, the examiner concurs, but as set forth above, Shiga's particular arrangement is for an outer rotor motor, which would affect placement of parts including the magnets and holes in the rotor core, which would also affect where Shiga's pots may be placed. It would be obvious to place the pots in the most convenient location to a destination with the shortest runner length to decrease waste material, while not affecting the quality of the end product or making the process overly costly.

37. Regarding the applicant's assertion that Osada discloses a different configuration wherein the resin pots are in the lower die, the examiner notes this, but as per 6:60-61, a pot may alternatively be located in an upper die.

38. Regarding applicant's assertion that the aspects of resin mold filling of the present invention do not apply to electrical parts encasing as set forth by Osada, the

Art Unit: 1791

examiner respectfully disagrees, as Osada is also resin encapsulating parts with upper and lower mold/dies, resin pots, and so forth.

### ***Conclusion***

39. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: JP 55-023707 of record (resin pot in upper die), US 5,527,173, US 2003/0030186, US 6,770,236, US 2005/0225190 [discloses that there are inner rotor type brushless motors, 0004].

40. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1791

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIMBERLY A. STEWART whose telephone number is (571)270-7004. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joe Del Sole can be reached on (571)272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

kas

/Joseph S. Del Sole/

Supervisory Patent Examiner, Art Unit 1791